

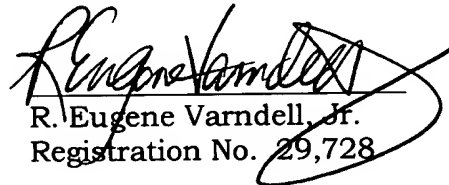
REMARKS

In the foregoing amendments, applicant's claims were amended to remove multiple dependent claims. Claim 57 was cancelled. Early consideration and allowance of claims 1-56 and 58-85 are respectfully requested.

Attached hereto is a marked-up version of the changes made to the claims. The attached pages are captioned "**Version with markings to show changes made.**" Early consideration and allowance of claims 1-56 and 58-85 are respectfully requested.

In the event any additional fees are due, please charge our Deposit Account No. 22-0256.

Respectfully submitted,  
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New US National Phase Application Based on PCT/JP99/05884

**VERSION WITH MARKINGS TO SHOW CHANGES MADE**

**IN THE CLAIMS:**

Claims 4, 6, 8, 13, 14, 16, 18-23, 26, 28, 32, 34-36, 41, 55, 56, 60, 62, 64, 71, 73-85 were amended as follows:

--4. (Amended) The enzyme according to claim 1 ~~any one of claims 1 to 3~~, wherein the enzyme is derived from the genus *Rhizopus* and has an average molecular weight of approximately 40 kD as determined by SDS-PAGE.--

--6. (Amended) The enzyme according to claim 1 ~~any one of claims 1 to 3~~, wherein the enzyme is derived from the genus *Mucor* and has an average molecular weight of approximately 41 kD as determined by SDS-PAGE.--

--8. (Amended) The enzyme according to claim 1 ~~any one of claims 1 to 3~~, wherein the enzyme is derived from the genus *Phycomyces* and has an average molecular weight of approximately 45 kD as determined by SDS-PAGE.--

--13. (Amended) The enzyme according to claim 10 ~~or 11~~, wherein the cellulose binding domain consists of the following amino acid sequence (III):

Cys-Ser-X1-X2-Tyr-X3-Gln-Cys-Gly-Gly-X4-X5-Trp-X6-Gly-Pro-Thr-Cys-Cys-X7-X8-Gly-X9-Thr-Cys-X10-X11-X12-X13-X14-Asn-X15-X16-Tyr-Ser-Gln-Cys-X17 (III) (SEQ ID NO: 20)

wherein:

X1 is Lys, Ser or Gln;

X2 is Leu, Ala, Val or Gly;

X3 is Gly, Tyr or Ser;

X4 is Lys or Ile;

X5 is Asn, Asp, Gly or Met;

X6 is Asn, Asp, Ser or Thr;

X7 is Glu, Asp or Thr;

X8 is Ser or Ala;

X9 is Ser or Phe;

X10 is Lys or Val;

X11 is Val, Asp, Ala or Gly;

X12 is Ser, Tyr, Gln or Ala;

X13 is Pro, Glu or Lys, or is absent;

X14 is Asp, Gly or Asn, or is absent;

X15 is Asp, Pro, Lys or Glu;

X16 is Tyr, Phe or Trp;

X17 is Leu, Val or Ile; and

one of X4 or X15 is Lys and the other is any amino acid residue except Lys.--

14. (Amended) The enzyme according to claim 10 or 11, wherein the cellulose binding domain consists of the following amino acid sequence (IV):  
Cys-Ser-Lys-X21-Tyr-X22-Gln-Cys-Gly-Gly-Lys-X23-Trp-X24-Gly-Pro-Thr-Cys-Cys-  
Glu-Ser-Gly-Ser-Thr-Cys-X25-X26-X27-X28-X29-Asn-X30-X31-Tyr-Ser-Gln-Cys-X32  
(IV) (SEQ ID NO: 21)

wherein:

X21 is Leu or Ala;

X22 is Gly or Tyr;

X23 is Asn or Asp;

X24 is Asn or Asp;

X25 is Lys or Val;

X26 is Val or Asp;

X27 is Ser or Tyr;

X28 is Pro, or is absent;

X29 is Asp, or is absent;

X30 is Asp or Pro;

X31 is Tyr or Phe; and

X32 is Leu or Val.--

--16. (Amended) The enzyme according to claim 10 ~~or 11~~, wherein the cellulose binding domain consists of the following amino acid sequence (V):

Cys-Ser-Ser-Val-Tyr-X41-Gln-Cys-Gly-Gly-Ile-Gly-Trp-X42-Gly-Pro-Thr-Cys-Cys-X43-X44-Gly-Ser-Thr-Cys-X45-Ala-Gln-X46-X47-Asn-Lys-Tyr-Tyr-Ser-Gln-Cys-X48 (V)

(SEQ ID NO: 25)

wherein:

X41 is Gly or Ser;

X42 is Ser or Thr;

X43 is Glu or Asp;

X44 is Ser or Ala;

X45 is Val or Lys;

X46 is Glu or Lys;

X47 is Gly or Asp; and

X48 is Leu or Ile.--

--18. (Amended) The enzyme according to claim 10 ~~or 11~~, wherein the cellulose binding domain consists of the amino acid sequence of SEQ ID NO: 28.

19. (Amended) The enzyme according to claim 10 ~~or 11~~, wherein the cellulose binding domain is located on its N-terminal side.

20. (Amended) The enzyme according to claim 10 ~~any one of claims 10 to 19~~, wherein the enzyme is capable of removing fuzz completely from regenerated cellulose fabrics at a concentration of 1 mg of the protein/L or below.

21. (Amended) The enzyme according to claim 10 ~~any one of claims 10 to 20~~, wherein its activity of fuzz removal from regenerated cellulose fabrics at pH 8.5 is 50% or more of its fuzz removal activity at the optimum pH.

22. (Amended) The enzyme according to claim 10 ~~any one of claims 10 to 21~~, wherein the enzyme is derived from *Zygomycotina*.

23. (Amended) The enzyme according to claim 10 ~~any one of claims 10 to 22~~, wherein the enzyme further comprises a part of its linker region consisting of the following amino acid sequence (VI):

Tyr-Xaa-Xaa-Xaa-X51-Gly-Gly-Xaa-X52-Gly (VI) (SEQ ID NO: 31)

wherein Xaa is independently any amino acid residue; and X51 and X52 are independently Ser or Thr.--

--26. (Amended) The enzyme according to claim 23 ~~any one of claims 23 to 25~~, wherein both X51 and X52 are Ser.--

--28. (Amended) The enzyme according to claim 23 ~~any one of claims 23 to 27~~, wherein the part of the linker region is located on the N-terminal side of the catalytic domain.--

--32. (Amended) The enzyme according to claim 29 ~~any one of claims 29 to 31~~, wherein both X51 and X52 are Ser.--

--34. (Amended) The enzyme according to claim 29 ~~any one of claims 23 to 33~~, wherein the enzyme is capable of removing fuzz completely from regenerated cellulose fabrics at a concentration of 1 mg of the protein/L or below.

35. (Amended) The enzyme according to claim 29 ~~any one of claims 23 to 34~~, wherein its activity of fuzz removal from regenerated cellulose fabrics at pH 8.5 is 50% or more of its fuzz removal activity at the optimum pH.

36. (Amended) The enzyme according to claim 29 ~~any one of claims 23 to 35~~, wherein the enzyme is derived from *Zygomycotina*.--

--38. (Amended) The enzyme according to claim 37, wherein the cellulose-binding domain consists of the amino acid sequence described in claim 10 ~~any one of claims 10 to 18~~.--

--41. (Amended) The enzyme according to claim 1 ~~any one of claims 1 to 39 or the modified protein according to claim 40~~, wherein the enzyme or the modified protein is modified so that Asn-linked oligosaccharide chains are not added thereto.--

--55. (Amended) The modified protein according to claim 40, wherein said modified protein consists of a modified amino acid sequence represented by SEQ ID NO: 1, 3, 5, 7, 9 or 11 which is modified so that the cellulose binding domain represents ~~one of~~ the amino acid sequences (I) ~~to (V)~~ described in claims 10, ~~11, 13, 14 and 16, respectively~~, and which may have a modification(s) in a region(s) other than said cellulose binding domain.

56. (Amended) The modified protein according to claim 40, wherein said modified protein consists of a modified amino acid sequence represented by SEQ ID NO: 1, 3, 5, 7, 9 or 11 which is modified so that a part of the linker region represents the amino acid sequence (VI) or (VII) described in claim 23 ~~or 24~~ and which may have a modification(s) in a region(s) other than said part of the linker region.--

--60. (Amended) A polynucleotide comprising a nucleotide sequence encoding the enzyme, protein, modified protein or homologue according to claim 1 ~~any one of claims 1 to 59~~.--

--62. (Amended) The polynucleotide according to claim 60 ~~or 61~~, wherein said polynucleotide comprises a nucleotide sequence in which codons have been optimized for a host by selecting those codons frequently used by the host.--

--64. (Amended) An expression vector comprising the polynucleotide according to claim 60 ~~any one of claims 60 to 63~~.

65. (Amended) A host cell transformed with the polynucleotide according to claim 60 ~~any one of claims 60 to 63 or the expression vector according to claim 64.~~--

--71. (Amended) A method for producing the enzyme, protein, modified protein or homologue ~~according to any one of claims 1 to 59~~, comprising cultivating the host cell according to claim 63 ~~any one of claims 63 to 70~~ and recovering the enzyme, protein, modified protein or homologue from said host cell and/or the resultant cultivation broth.--

--73. (Amended) A cellulase preparation comprising the enzyme, protein, modified protein or homologue according to claim 1 ~~any one of claims 1 to 59 and 72~~.

74. (Amended) A method of treating cellulose-containing fabrics, comprising a step of contacting the cellulose-containing fabrics with the enzyme, protein, modified protein or homologue according to claim 1 ~~any one of claims 1 to 59 and 72 or the cellulase preparation according to claim 73~~.

75. (Amended) A method of reducing the rate at which cellulose-containing fabrics become fuzzy or for reducing fuzzing in cellulose-containing fabrics, comprising a step of contacting the cellulose-containing fabrics with the enzyme, protein, modified protein or homologue according to claim 1 ~~any one of claims 1 to 59 and 72 or the cellulase preparation according to claim 73~~.

76. (Amended) A method of weight loss treatment for cellulose-containing fabrics to improve its touch and appearance, comprising a step of contacting the cellulose-containing fabrics with the enzyme, protein, modified protein or homologue



according to claim 1 ~~any one of claims 1 to 59 and 72 or the cellulase preparation according to claim 73.~~

77. (Amended) A method of providing color clarification of colored cellulose-containing fabrics, comprising a step of treating the colored cellulose-containing fabrics with the enzyme, protein, modified protein or homologue according to claim 1 ~~any one of claims 1 to 59 and 72 or the cellulase preparation according to claim 73.~~

78. (Amended) A method of providing a localized variation in color of colored cellulose-containing fabrics, comprising a step of treating the colored cellulose-containing fabrics with the enzyme, protein, modified protein or homologue according to claim 1 ~~any one of claims 1 to 59 and 72 or the cellulase preparation according to claim 73.~~

79. (Amended) A method of reducing the rate at which cellulose-containing fabrics become stiff or reducing stiffness in cellulose-containing fabrics, comprising a step of treating the cellulose-containing fabrics with the enzyme, protein, modified protein or homologue according to claim 1 ~~any one of claims 1 to 59 and 72 or the cellulase preparation according to claim 73.~~

80. (Amended) The method according to claim 74 ~~any one of claims 74 to 79~~, wherein the treatment of the fabrics is performed through soaking, washing or rinsing the fabrics.

81. (Amended) An additive to detergent comprising the enzyme, protein, modified protein or homologue according to claim 1 ~~any one of claims 1 to 59 and 72 or the cellulase preparation according to claim 73~~ in a non-scattering granular form or a stabilized liquid form.

82. (Amended) A detergent composition comprising the enzyme, protein, modified protein or homologue according to claim 1 ~~any one of claims 1 to 59 and 72 or the cellulase preparation according to claim 73.~~

83. (Amended) A method of improving the freeness of a paper pulp, comprising a step of treating the paper pulp with the enzyme, protein, modified protein or homologue according to claim 1 ~~any one of claims 1 to 59 and 72 or the cellulase preparation according to claim 73.~~

84. (Amended) A method of deinking a waste paper, comprising a step of treating the waste paper with the endoglucanase, modified protein or homologue according to claim 1 ~~any one of claims 1 to 59 and 72 or the cellulase preparation according to claim 73~~ in the presence of a deinking agent.

85. (Amended) A method of improving the digestibility of an animal feed, comprising a step of treating a cellulose-containing feed with the enzyme, protein, modified protein or homologue according to claim 1 ~~any one of claims 1 to 59 and 72 or the cellulase preparation according to claim 73.~~--